

**UNITED STATES DEPARTMENT OF AGRICULTURE  
NATURAL RESOURCES CONSERVATION SERVICE**

**ECOLOGICAL SITE DESCRIPTION**

**ECOLOGICAL SITE CHARACTERISTICS**

**Site Type:** Rangeland

**Site Name:** Salt Flats (SD-2 & 3)

**Site ID:** R042XB036NM

**Major Land Resource Area:** 042 - Southern Desertic Basins, Plains, and Mountains

## **Physiographic Features**

This site usually occurs on level to gently sloping, broad alluvial flats. Slopes usually do not exceed 3 percent. Elevations range from 3,700 feet to 5,000 feet.

Land Form: (1) Alluvial flat  
(2) Flood plain  
(3) Valley flat

	<u>Minimum</u>	<u>Maximum</u>
<u>Elevation (feet):</u>	3700	5000
<u>Slope (percent):</u>	0	3
<u>Water Table Depth (inches):</u>	N/A	N/A
<u>Flooding:</u>		
Frequency:	Very rare	Rare
Duration:	Extremely brief	Brief
<u>Ponding:</u>		
Depth (inches):	1	4
Frequency:	Rare	Occasional
Duration:	Very brief	Brief
<u>Runoff Class:</u>	Low	Medium
<u>Aspect:</u>	No Influence on this site	

## **Climatic Features**

Annual average precipitation ranges from 8 to 10.5 inches. Wide fluctuations from year to year are common, ranging from a low of about 2 inches to a high of over 20 inches. At least one-half of the annual precipitation comes in the form of rainfall during July, August, and September. Precipitation in the form of snow or sleet averages less than 4 inches annually.

	<u>Minimum</u>	<u>Maximum</u>
<u>Frost-free period (days):</u>	179	212
<u>Freeze-free period (days):</u>	200	233
<u>Mean annual precipitation (inches):</u>	8.0	10.5

### Monthly precipitation (inches) and temperature (°F):

	<u>Jan</u>	<u>Feb</u>	<u>Mar</u>	<u>Apr</u>	<u>May</u>	<u>Jun</u>	<u>Jul</u>	<u>Aug</u>	<u>Sep</u>	<u>Oct</u>	<u>Nov</u>	<u>Dec</u>
Precip. Min.	0.37	0.36	0.23	0.18	0.29	0.57	1.42	1.92	1.53	1.01	0.48	0.57
Precip. Max.	0.54	0.39	0.27	0.36	0.45	0.64	1.9	2.2	1.66	1.07	0.58	0.78
Temp. Min.	20.8	25.5	31.2	38.0	46.4	54.3	61.1	59.1	51.5	39.8	28.8	22.3
Temp. Max.	58.1	63.8	71.0	79.3	87.4	96.4	95.5	92.7	87.5	78.7	67.2	58.8

Climate Stations: (1) NM3855, Hatch. Period of record 1961 - 1990  
(2) NM8387, Socorro. Period of record 1961 - 1990

## **Influencing Water Features**

This site is not influenced by water from wetlands or streams.

<u>Wetland Description:</u> (Cowardin System)	<u>System</u>	<u>Subsystem</u>	<u>Class</u>
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## **Representative Soil Features**

The soils of this site are deep to shallow, medium to moderately fine-textured in the surface and have moderately to slowly permeable sub-soils. Soils contain varying amounts of salt and alkali accumulations, which are inhibitory to certain plant species.

### Predominant Parent Materials:

Kind: Alluvium

Origin: Mixed

Surface Texture: (1) Silty clay loam  
(2) Loam  
(3) Clay loam

Subsurface Texture Group: Loamy

Surface Fragments <=3" (% Cover): 0

Surface Fragments > 3" (% Cover): 0

Subsurface Fragments <=3" (% Volume): 0

Subsurface Fragments > 3" (% Cover): 0

Drainage Class: Moderately well drained To Well drained

Permeability Class: Slow To Moderate

	<u>Minimum</u>	<u>Maximum</u>
<u>Depth (inches):</u>	20	72
<u>Electrical Conductivity (mmhos/cm):</u>	2	16
<u>Sodium Absorption Ratio:</u>	1	13
<u>Calcium Carbonate Equivalent (percent):</u>	N/A	N/A
<u>Soil Reaction (1:1 Water):</u>	7.9	9.6
<u>Soil Reaction (0.01M CaCl2):</u>	N/A	N/A
<u>Available Water Capacity (inches):</u>	3.0	7.0

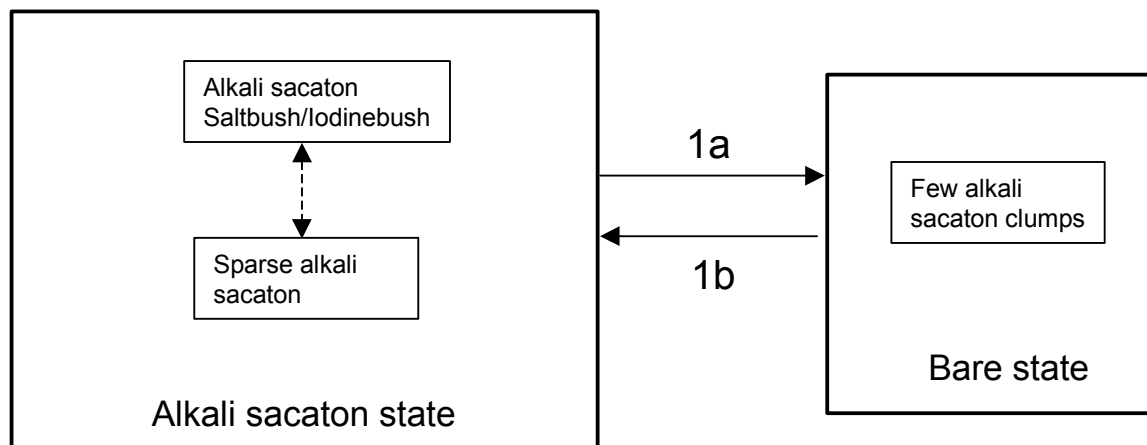
## Plant Communities

### Ecological Dynamics of the Site

#### Overview

The soils and vegetation of this site intergrades with that of the Gyp Upland (the “gyp flats” type) and Loamy sites, depending on the levels of gypsum and sodicity/salinity, respectively. Salt flats can be associated with playas that are barren because they are inundated for long periods. Differences in sodicity within the Salt Flats site have important effects on soil properties. Differences in salinity control plant composition directly. The historic plant community type of the salt flats site is dominated by alkali sacaton (*Sporobolus airoides*) and scattered small shrubs, especially four-wing saltbush (*Atriplex canescens*), other *Atriplex* species, and iodinebush (*Allenrolfea occidentalis*). Alkali sacaton is patchily distributed in this site, and large patches of bare ground may be common. Fluctuations in sacaton cover may occur in response to drought or grazing pressure. Drought and/or overgrazing may lead to plant mortality. Subsequent reductions of water infiltration through the soil surface may inhibit reestablishment. The concentration of sodium and/or salts at the soil surface may also play a role in retarding sacaton establishment in patches and larger areas. Bare areas may persist for decades or longer. Alteration of surface hydrology, such that run-in water is diverted away from grass patches, may also lead to grass loss. No systematic studies of communities, states or transitions have been performed in the salt flats site.

#### State-Transition model: MLRA 42, SD-2 and 3, Salt flats



1a. Interruption of run-in water, soil sealing

1b. Restore run-in water, increase soil permeability, seeding

## MLRA 42; SD-2 and 3; Salt flats

### Alkali sacaton state



- Alkali sacaton, iodinebush, saltbush
- Ungrazed by cattle for over 50 yr
- Sacaton stature low, large bare patches common, salt accumulation
- Marcial-Ubar association, White Sands Missile Range

### Alkali sacaton state



- Alkali sacaton, saltbush, mesquite
- Note tall sacaton stature
- Salt accumulation at surface
- Intergradation of salt flats and Gyp Upland ("gypsum flats")
- White Sand Missile Range

### Alkali sacaton state



- Pure alkali sacaton
- Bare patches of up to a few meters in diameter
- Hondale silt loam, near Lordsburg playa, Hidalgo, Co., NM

### Bare state



- Mostly bare, few sacaton clumps
- Hondale silt loam, near Lordsburg playa, Hidalgo, Co., NM

Plant Community Name: Historic Climax Plant Community

Plant Community Sequence Number: 1 Narrative Label: HCPC

Plant Community Narrative:

### State Containing Historic Climax Plant Community

#### Alkali sacaton State

Alkali sacaton grassland: Alkali sacaton is dominant and four-wing saltbush and/or iodinebush are scattered throughout. Iodinebush may be considered as an index species for this site. Other Atriplex species may also be present (some are rare, such as *Atriplex griffithsii*). In some cases, a moderate diversity of grasses may be present, including vine mesquite (*Panicum obtusum*) and tobosa (*Pleuraphis mutica*). In other cases (e.g. soils with higher salinity), alkali sacaton is the sole perennial grass. In some cases, mesquite (*Prosopis glandulosa*) may be present but this shrub should be limited on saline soils. Mesquite increases may be associated with soils more closely allied to loamy ecological sites. Bare patches or even large, continuous areas may naturally occur, perhaps reflecting the consequences of past drought events, areas with very high salinity (e.g. greater than ca. 3% dry soil weight in the top 10 cm; Ungar 1966), or areas in which water ponds for long periods. Heavy grazing may result in the loss of alkali sacaton plants and, in some cases, increases in the relative abundance of other grasses such as burrograss (*Scleropogon brevifolius*). Distinguishing human-caused bare areas from naturally bare areas may be difficult in this site.

Diagnosis: Alkali sacaton cover is high in favorable topographic positions. Some bare patches are present.

#### Ground Cover (Average Percent of Surface Area).

Grasses & Forbs	20
Bare ground	60
Surface gravel	5
Surface cobble and stone	0
Litter (percent)	15
Litter (average depth in cm.)	5

#### Plant Community Annual Production (by plant type):

Plant Type	Annual Production (lbs/ac)		
	Low	RV	High
Grass/Grasslike	260	488	715
Forb	44	82	121
Tree/Shrub/Vine	96	180	264
Lichen			
Moss			
Microbiotic Crusts			
Totals	400	750	1100

Alkali Sacaton State Plant Species Composition: Plant species are grouped by annual production **not** by functional groups.

			Annual Production in Pounds Per Acre	
Group	Grass/Grasslike Common Name	Scientific Name	Low	High
1	alkali sacaton	<i>Sporobolus airoides</i>	263	338
2	vine mesquite	<i>Panicum obtusum</i>	23	60
3	black grama	<i>Bouteloua eriopoda</i>	8 <sup>23</sup>	38 <sup>60</sup>
4	cane bluestem	<i>Bothriochloa barbinodis</i>	23	60
	plains bristlegrass	<i>Setaria vulpiseta</i>		
	sand dropseed	<i>Sporobolus cryptandrus</i>		
	big sacaton	<i>Sporobolus wrightii</i>		
5	inland saltgrass	<i>Distichlis spicata</i>	8	38
6	threeawn	<i>Aristida</i>	23	60
	fluffgrass	<i>Dasyochloa pulchella</i>		
	tobosagrass	<i>Pleuraphis mutica</i>		
	burrograss	<i>Scleropogon brevifolius</i>		
7	Graminoid (grass or grasslike)		8	23

			Annual Production in Pounds Per Acre	
Group	Shrub/Vine Common Name	Scientific Name	Low	High
8	fourwing saltbush	<i>Atriplex canescens</i>	23	60
9	iodinebush	<i>Allenrolfea occidentalis</i>	60	90
	saltbush	<i>Atriplex</i>		
10	crown of thorns	<i>Koeberlinia spinosa</i>	8	23
11	broom snakeweed	<i>Gutierrezia sarothrae</i>	8	23
12	baccharis	<i>Baccharis</i>	8	23
	Mormon tea	<i>Ephedra viridis</i>		

			Annual Production in Pounds Per Acre	
Group	Forb Common Name	Scientific Name	Low	High
13	desert holly	<i>Acourtia nana</i>	23	60
	goldenbush	<i>Isocoma</i>		
	rayless goldenrod	<i>Isocoma pluriflora</i>		
	desert seepweed	<i>Suaeda suffrutescens</i>		
	crinklemat	<i>Tiquilia</i>		
14	Forb, annual		8	38
15	Forb, perennial		8	38

Plant Growth Curve:

Growth Curve Number:

Growth Curve Name:

Growth Curve Description:

NM2518

Historic Climax Plant Community

SD-2 Warm Season Plant Community

Percent Production by Month											
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	10	10	25	30	15	5	0	0

### **Additional States:**

**Transition to bare state (1a):** Factors leading to the loss of sacaton, such as drought, grazing, or other disturbances can set this transition in motion. Once grasses are lost, the loss of soil organic matter, root channels and structures that intercept water may lead to soil sealing and reduced infiltration. Furthermore, the sodic (alkali) subsoil layers that are exposed following loss of topsoil are highly susceptible to soil sealing. Once soil sealing occurs, salts can accumulate at the soil surface and increase to toxic levels. Soil compaction and degradation by trampling may also contribute to soil sealing. In addition, interruption of overland water flow (e.g. by a road) may reduce soil water availability to the point where sacaton plants die and cannot reestablish. These factors inhibit grass reestablishment and may lead to long-term soil degradation.

Key indicators of approach to transition: Decadence and mortality in alkali sacaton, reduced litter, increased bare ground, increases in topsoil salinity and sodicity.

*Bare:* These communities are largely barren with a variable cover of alkali sacaton or perhaps other grasses. Sacaton plants often appear decadent.

**Diagnosis: Bare ground predominates.**

**Transition to alkali sacaton grassland (1b):** Run-in water must be restored if it was interrupted. If erosion, high surface salinity, and reduced infiltration restrict grass abundance, restoration is probably impossible. Flushing and leaching of salts is limited by natric horizons. Accumulation of non-saline sediments that have eroded from areas upslope may facilitate grass recolonization over time. Seed germination seems to be favored by cracks in the soil (De Alba-Avila and Cox 1988), so such sites could be favorable for seeding attempts where salinity is not limiting.

*Information sources and theoretical background:* Communities, states, and transitions are based upon information in the ecological site description and observations by Brandon Bestelmeyer, Jornada Experimental Range and Arlene Tugel, NRCS. Information on the causes of patchiness in alkali sacaton is sorely needed.

## **Ecological Site Interpretations**

### **Animal Community:**

This site provides habitat which support a resident animal community that is characterized by coyote, black-tailed jackrabbit, desert cottontail, bannertail kangaroo rat, scaled quail, loggerhead shrike, horned lark, meadowlark, little striped whiptail lizard, and Texas horned lizard.

### **Hydrology Functions:**

The runoff curve numbers are determined by field investigations using hydraulic cover conditions and hydrologic soil groups.

Hydrologic Interpretations	
Soil Series	Hydrologic Group
Hondale	D
Mimbres	C

### **Recreational Uses:**

Suitability for camping and picnicking is fair to poor, limited mostly by weather extremes. Hunting is fair for pronghorn antelope, quail, dove, small game, and waterfowl where seasonal open water occurs. Photography and bird watching can be fair to good, especially during migration seasons. Most small animals of the site are nocturnal and secretive, seen only at night, early morning or evening. Scenic beauty is greatest during spring and sometimes summer months when flowering of forbs, shrubs, and cacti occurs.

### **Wood Products:**

This site has no significant value for wood products.

### **Other Products:**

This site is suitable for grazing in all seasons of the year. Most of the palatable green forage for livestock is produced in the summer months and lends the site to seasonal use. . It is suited to grazing by cattle, sheep, goats, and horses, generally without regard to class of livestock. Retrogression caused by inadequately managed grazing usually results in such plants as black grama, and fourwing saltbush being replaced by burrograss, tobosa, other Atriplex species, and seepweed. Mesquite and allthorn may dominate the site eventually, and recovery may be slow under grazing management.

### **Other Information:**

Guide to Suggested Initial Stocking Rate Acres per Animal Unit Month	
Similarity Index	Ac/AUM
100 - 76	2.8 – 3.7
75 – 51	3.5 – 5.5
50 – 26	5.0 – 10.5
25 – 0	10.5 - +

**Plant Preference by Animal Kind:**

	Code	Species Preference	Code
Stems	S	None Selected	N/S
Leaves	L	Preferred	P
Flowers	F	Desirable	D
Fruit/Seeds	F/S	Undesirable	U
Entire Plant	EP	Not Consumed	NC
Underground Parts	UP	Emergency	E
		Toxic	T

Animal Kind: Livestock

Animal Type: Cattle

Common Name	Scientific Name	Plant Part	Forage Preferences											
			J	F	M	A	M	J	J	A	S	O	N	D
alkali sacaton	Sporobolus airoides	EP	U	U	U	D	D	D	P	P	D	U	U	U
Vine mesquite	Panicum obtusum	EP	D	D	D	D	D	D	P	P	P	D	D	D
plains bristlegrass	Setaria vulpiseta	EP	D	D	D	D	D	P	P	P	P	D	D	D
cane bluestem	Bothriochloa barbinodis	EP	D	D	D	D	D	P	P	P	D	D	D	D
giant sacaton	Sporobolus Wrightii	EP	U	U	U	D	D	D	P	P	D	U	U	U
inland saltgrass	Distichlis spicata	EP	U	U	U	U	D	D	P	P	D	D	U	U
fourwing saltbush	Atriplex canescens	EP	P	P	P	P	P	D	D	D	D	D	P	P

## **Supporting Information**

### Associated Sites:

<u>Site Name</u>	<u>Site ID</u>	<u>Site Narrative</u>
Gyp Uplands	R042XB006NM	
Loamy	R042XB014NM	

### Similiar Sites:

<u>Site Name</u>	<u>Site ID</u>	<u>Site Narrative</u>
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### State Correlation:

This site has been correlated with the following states:

### Inventory Data References:

<u>Data Source</u>	<u>Number of Records</u>	<u>Sample Period</u>	<u>State</u>	<u>County</u>
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### Type Locality:

### Relationship to Other Established Classifications:

### Other References:

Data collection for this site was done in conjunction with the progressive soil surveys within the Southern Desertic Basins, Plains and Mountains, Major Land Resource Areas of New Mexico. This site has been mapped and correlated with soils in the following soil surveys. Sierra County Dona Ana County Grant County Hidalgo County Luna County Otero County

### Characteristic Soils Are:

Hondale silt loam, strongly alkali	Hondale loam, strongly alkali
Hondale soils, strongly alkali	Hondale sandy clay loam
Mimbres silty clay loam, alkali, not flooded	

### Other Soils included are:

Marcial silty clay loam	Ubar silt loam
Mead silt oam	Reagan loam, saline
Hurley loam, saline	Reeves loam, saline
Karro loam, saline	Bigetty loam, moderately saline

### Site Description Approval:

<u>Author</u>	<u>Date</u>	<u>Approval</u>	<u>Date</u>
Don Sylvester	07/12/1979	Don Sylvester	07/12/1979

### Site Description Revision:

<u>Author</u>	<u>Date</u>	<u>Approval</u>	<u>Date</u>
Dr. Brandon Bestelmeyer	02/27/03	George Chavez	03/04/03
George Chavez	02/27/03		